I CLAIM:

1. A method of separating a slurry containing intermixed particulate materials of different specific gravity comprising:

providing a centrifuge bowl having a peripheral wall and an open mouth;

rotating the bowl about a longitudinal axis so as to rotate the peripheral wall around the axis;

feeding the materials to the bowl so as to pass over the peripheral wall and causing the materials to separate such that a heavier portion of the materials collects on the peripheral wall while a lighter portion of the materials in the slurry escapes over the open mouth;

defining on the peripheral wall at least one axially localized annular recess for collecting the heavier portion of the materials;

defining in the recess an upper side wall and a lower side wall converging to a base interconnecting the side walls;

providing at the recess a plurality of angularly spaced discharge ports each for allowing materials collecting in the recess to discharge outwardly from the peripheral wall, each discharge port being located with a mouth at the base;

providing for each discharge port a valve operable for closing the port for preventing discharge of collecting materials and for opening the port, and periodically operating the valve during the separation of the materials to allow said discharge;

collecting the outwardly discharge materials;

injecting fluidizing liquid into the recess through a plurality of fluid injection ports arranged at angularly spaced positions around the recess for fluidizing the material in the recess;

providing in the recess a bed of movable bodies free to move within the recess and located inwardly of the fluid injection ports and inwardly of the discharge ports;

the movable bodies being larger than the particles and shaped to as to define interstices between the bodies so as to allow the particles to pass therebetween;

and confining the movable bodies within the recess.

2. The method according to Claim 1 wherein the movable bodies are generally spherical.

3. The method according to Claim 1 wherein the movable bodies are confined in the recess by a radially inner screen and a radially outer screen.

4. The method according to Claim 3 wherein the inner screen and the outer screen are connected to form an insert member separate from the recess so as to be removable therefrom.

5. The method according to Claim 4 wherein the inner screen and the outer screen are connected by two side walls of the insert member spaced by a width of the recess.

6. The method according to Claim 5 wherein the side walls lie in radial planes of the axis of the bowl;

7. The method according to Claim 5 wherein the recess has the side walls thereof each of which has a portion lying in a radial plane of the bowl at the side walls of the insert member.

8. The method according to Claim 5 wherein the recess has at least one side wall thereof which has a portion which is removable to allow release of the insert member.

9. The method according to Claim 5 wherein at least one of the side walls has an opening therein through which the bodies can be fed into the insert member.

10. The method according to Claim 1 wherein the bed of the movable bodies is arranged relative to the fluid injection so that at least some of the bodies are moved radially inwardly of the bowl by inward fluid movement when the discharge ports are closed and at least some of the bodies are moved radially outwardly of the bowl by outward fluid movement when the discharge ports are opened.

11. The method according to Claim 1 wherein the bed of movable bodies comprises sufficient of the bodies to provide a single layer of the bodies substantially in contact with one another within the recess.

12. A centrifuge apparatus for use in separating a slurry containing intermixed particulate materials of different specific gravity comprising:

a centrifuge bowl having a peripheral wall and an open mouth;

the bowl being mounted for rotation about a longitudinal axis so as to rotate the peripheral wall around the axis;

the bowl being arranged for feeding the materials to the bowl so as to pass over the peripheral wall and causing the materials to separate such that a heavier portion of the materials collects on the peripheral wall while a lighter portion of the materials in the slurry escapes over the open mouth;

at least one axially localized annular recess on the peripheral wall for collecting the heavier portion of the materials;

the recess having an upper side wall and a lower side wall converging to a base interconnecting the side walls;

a plurality of angularly spaced discharge ports at the recess each for allowing materials collecting in the recess to discharge outwardly from the peripheral wall, each discharge port being located with a mouth at the base;

each discharge port having a valve operable for closing the port for preventing discharge of collecting materials and for opening the port and arranged for periodically operating the valve during the separation of the materials to allow said discharge;

a plurality of fluid injection ports for injecting fluidizing liquid into the recess arranged at angularly spaced positions around the recess for fluidizing the material in the recess;

a bed of movable bodies in the recess free to move within the recess and located inwardly of the fluid injection ports and inwardly of the discharge ports;

the movable bodies being larger than the particles and shaped to as to define interstices between the bodies so as to allow the particles to pass therebetween;

and confining members mounted in the recess for confining the movable bodies within the recess.

13. The apparatus according to Claim 12 wherein the movable bodies are generally spherical.

14. The apparatus according to Claim 12 wherein the movable bodies are confined in the recess by a radially inner screen and a radially outer screen.

15. The apparatus according to Claim 14 wherein the inner screen and the outer screen are connected to form an insert member separate from the recess so as to be removable therefrom.

16. The apparatus according to Claim 15 wherein the inner screen and the outer screen are connected by two side walls of the insert member spaced by a width of the recess.

17. The apparatus according to Claim 16 wherein the side walls lie in radial planes of the axis of the bowl;

18. The apparatus according to Claim 16 wherein the recess has the side walls thereof each of which has a portion lying in a radial plane of the bowl at the side walls of the insert member.

19. The apparatus according to Claim 16 wherein the recess has at least one side wall thereof which has a portion which is removable to allow release of the insert member.

20. The apparatus according to Claim 16 wherein at least one of the side walls has an opening therein through which the bodies can be fed into the insert member.

21. The apparatus according to Claim 12 wherein the bed of the movable bodies is arranged relative to the fluid injection so that at least some of the bodies are moved radially inwardly of the bowl by inward fluid movement when the discharge ports are closed and at least some of the bodies are moved radially outwardly of the bowl by outward fluid movement when the discharge ports are opened.

22. The apparatus according to Claim 12 wherein the bed of movable bodies comprises sufficient of the bodies to provide a single layer of the bodies substantially in contact with one another within the recess.

23. An insert member for use in a centrifuge apparatus for separating a slurry containing intermixed particulate materials of different specific gravity, the centrifuge apparatus including:

a centrifuge bowl having a peripheral wall and an open mouth;

the bowl being mounted for rotation about a longitudinal axis so as to rotate the peripheral wall around the axis;

the bowl being arranged for feeding the materials to the bowl so as to pass over the peripheral wall and causing the materials to separate such that a heavier portion of the materials collects on the peripheral wall while a lighter portion of the materials in the slurry escapes over the open mouth;

at least one axially localized annular recess on the peripheral wall for collecting the heavier portion of the materials;

the recess having an upper side wall and a lower side wall converging to a base interconnecting the side walls;

a plurality of angularly spaced discharge ports at the recess each for allowing materials collecting in the recess to discharge outwardly from the peripheral wall, each discharge port being located with a mouth at the base;

each discharge port having a valve operable for closing the port for preventing discharge of collecting materials and for opening the port and arranged for periodically operating the valve during the separation of the materials to allow said discharge;

and a plurality of fluid injection ports for injecting fluidizing liquid into the recess arranged at angularly spaced positions around the recess for fluidizing the material in the recess;

the insert member comprising:

a bed of movable bodies in the recess free to move within the recess and located inwardly of the fluid injection ports and inwardly of the discharge ports;

the movable bodies being larger than the particles and shaped to as to define interstices between the bodies so as to allow the particles to pass therebetween;

and confining members including a radially inner screen and a radially outer screen connected by two side walls of the insert member spaced by a width of

the recess and arranged to be mounted in the recess for confining the movable bodies within the recess.

24. The insert member according to Claim 23 wherein the movable bodies are generally spherical.

25. The insert member according to Claim 23 wherein the side walls lie in radial planes of the axis of the bowl;

26. The insert member according to Claim 23 wherein at least one of the side walls has an opening therein through which the bodies can be fed into the insert member.

27. The insert member according to Claim 23 wherein the bed of movable bodies comprises sufficient of the bodies to provide a single layer of the bodies substantially in contact with one another within the recess.